

## Agouti paca. By Elizabeth M. Pérez

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### Agouti Lacépède, 1799

- Mus* Linnaeus, 1766:79 (part).  
*Cavia* Erxleben, 1777:348 (part, not *Cavia* Pallas, 1766).  
*Agouti* Lacépède, 1799:9. Type species *Agouti paca* Lacépède, 1799, by monotypy (= *Mus paca* Linnaeus, 1766).  
*Coelogenys* Cuvier, 1807:203. Type species *Mus paca* Linnaeus, 1766, by subsequent designation (Thomas, 1924).  
*Coelogenys* Illiger, 1811:92. Emendation of *Coelogenys* Cuvier, 1807.  
*Paca* Fisher, 1814:85. Type species *C[avia]. paca* Fisher, 1814:85, by original designation (= *Mus paca* Linnaeus, 1766).  
*Osteopera* Harlan, 1825:126. Type species *Osteopera platycephala* Harlan, 1825, by monotypy.  
*Cuniculus* Hollister, 1913:79. Based on *Paca* Brisson, 1762 (= *Mus paca* Linnaeus, 1766). *Cuniculus* Hollister, 1913, is a junior homonym of *Cuniculus* Wagler, 1830:21 (a microtine rodent).  
*Stictomys* Thomas, 1924:238. Type species *Stictomys taczanowskii* (Stolzman, 1885), by original designation. Valid as a subgenus; used at generic level by Cabrera (1961).

**CONTEXT AND CONTENT.** Order Rodentia, Suborder Hystricognathi, Infraorder Caviomorpha, Superfamily Caviioidea, Family Agoutidae. The family contains one genus with two extant species: *Agouti taczanowskii* and *A. paca*. A key to species follows:

Reddish-brown coat color, soft fur, shorter length of body and zygomatic region less rugose than the other species \_\_\_\_\_

*Agouti taczanowskii*

Reddish-brown to dark chocolate or smoke-gray coat color, harsh fur, larger length of body and zygomatic region more rugose than the other species \_\_\_\_\_ *Agouti paca*

### Agouti paca (Linnaeus, 1766)

#### Paca

- [*Mus*] *paca* Linnaeus, 1766:81. Type locality "Brasilia, Guiana." Restricted to Pernambuco, Brazil, by Lönnberg (1921:43).  
*[Cavia] paca* Erxleben, 1777:356 (= *Mus paca* Linnaeus, 1766).  
*Agouti paca* Lacépède, 1799:9 (= *Mus paca* Linnaeus, 1766).  
*C[avia] paca alba* Kerr, 1792:216. Type locality "environs of the river St. Francis in South America" (= Rio Sao Francisco, Minas Geraes, Brazil).  
*Coelogenys subniger* Cuvier, 1807:206. Type locality "Tobago."  
*Coelogenys fulvus* Cuvier, 1807:207. Based on Brisson (1762), Buffon (1763), and Geoffroy St.-Hilaire (1803); therefore, type locality is Cayenne, French Guiana.  
*[Paca] maculata* Fisher, 1814:87. Type locality "Guiana, Brasilia."  
*[Coelogenys] brunnea* Von Olfers, 1818:213. Type locality "Sudamerica."  
*[Coelogenys] rufa* Von Olfers, 1818:213. Type locality "Sudamerica."  
*Coelogenys paca*: Wied-Neuwied, 1821:254, name combination.  
*Osteopera platycephala* Harlan, 1825:126. Based on a skull of unknown origin found on "the shore of the river Delaware," U.S.A.  
*[Coelogenys] fulvus*: Wied-Neuwied, 1826:247, name combination.  
*Coelogenys subniger*: Wied-Neuwied, 1826:457, name combination.  
*Coelogenys paca*: Rengger, 1830:251, name combination.  
*Coelogenys fuscus* Lesson, 1842:103. Type locality "Guyane; Brésil."  
*Coelogenys sublaevis* Gervais, 1854:326. Type locality "Colombie."  
*Paca americana* Liais, 1872:538. Type locality "le Brésil, la Guyane et le Paraguay."  
*Agouti paca virgatus* Bangs, 1902:47. Type locality "Divala," Chiriqui, Panama.

*Coelogenys paca mexianae* Hagmann, 1908:25. Type locality "Insel Mexiana," Para, Brazil.

*Agouti paca nelsoni* Goldman, 1913:9. Type locality "Catemaco, southern Vera Cruz, Mexico."

*Cuniculus paca nelsoni*: Hollister, 1913:79, name combination.

*Cuniculus paca paca*: Hollister, 1913:79, name combination.

*Cuniculus paca virgatus*: Hollister, 1913:79, name combination.

*Cuniculus paca sublaevis*: Hollister, 1913:79, name combination.

[*Coelogenys*]. *p[aca]. virgata*: Lönnberg, 1921:45, name combination.

*Coelogenys paca guanta* Lönnberg, 1921:45. Type locality "Gualea, 5,000 feet," Pichincha, Ecuador.

[*Coelogenys*] *guanta*: Thomas, 1924:239, name combination.

[*Cuniculus*] *paca alba*: Tate, 1935:316, name combination.

[*Cuniculus*] *subniger*: Tate, 1935:316, name combination.

[*Cuniculus*] *fulvus*: Tate, 1935:316, name combination.

[*Cuniculus*] *sublaevis*: Tate, 1935:316, name combination.

[*Cuniculus*] *paca mexianae*: Tate, 1935:316, name combination.

[*Cuniculus*] *paca guanta*: Tate, 1935:316, name combination.

[*Agouti*]. *p[aca]. mexianae*: Krumbiegel, 1940:224, name combination.

*Agouti paca venezuelica* Krumbiegel, 1940:233. Type locality "Maracay, Venezuela."

[*Agouti paca*] *guanta*: Krumbiegel, 1940:237, name combination.

**CONTEXT AND CONTENT.** Context as in generic summary above. Five subspecies of *Agouti paca* are recognized (Cabrera, 1961; Hall, 1981):

*A. p. guanta* Lönnberg, 1921:45. Type locality "Gualea, 5,000 feet," Province of Pichincha, Ecuador.

*A. p. mexianae* Hagmann, 1908:25. Type locality "Insel Mexiana," Para, Brazil.

*A. p. nelsoni* Goldman, 1913:9. Type locality "Catemaco, southern Vera Cruz, Mexico."

*A. p. paca* Linnaeus, 1766:81. Type locality "Pernambuco, Brazil."

*A. p. virgatus* Bangs, 1902:47. Type locality "Divala," Chiriqui, Panama.

**DIAGNOSIS.** *Agouti paca* resembles *A. taczanowskii* in most external features. *A. paca* is distinguished by its relatively larger body size, thinner and harsher fur, shorter nasals, larger orbits, more posteriorly situated postorbital, thicker claws and less granulated soles. The zygomatic region generally is more rugose (Ellerman, 1940).



FIG. 1. Adult female paca (*Agouti paca*) in Venezuela. Photograph by E. Pérez.



FIG. 2. Distribution of *Agouti paca*: 1, *A. p. guanta*; 2, *A. p. mexicana*; 3, *A. p. nelsoni*; 4, *A. p. paca*; 5, *A. p. virgatus*. Boundaries between subspecies are not shown because subspecies are not well defined. Adapted from Mares and Ojeda (1982) and Hall (1981).

**GENERAL CHARACTERS.** *Agouti paca* is one of the largest living rodents. Its body is heavy and robust. The upper coat color varies from reddish brown to dark chocolate or smoke-gray and there is a pattern of white or pale-yellowish irregular spots on the flanks (Fig. 1). These spots, most numerous in young, are arranged in a variable number (two to seven, four on the average) of longitudinal rows. One or two upper rows are shorter and limited to the posterior one-half of the body. At least the two middle rows extend from the neck to the rump. The lowest row is visible only in its extreme anterior and posterior parts, its median part is fused with the white ventral surface of the body (Husson, 1978).

The somewhat squared head is marked by thick, fleshy lips, elaborate nares, large eyes, prominent (up to 150 mm in length) stiff rostral vibrissae and a tuft of vibrissae below the ear and behind the eye. The tail is naked and short, often hardly noticeable (Husson, 1978). Females have an inguinal and an axillary pair of mammae (Mondolfi, 1972).

The legs are short and the toes are elongated, tending toward a digitigrade condition. The forefeet have four digits and a rudimentary thumb bearing a small claw. Digit two is longer than digit five, but shorter than the central pair. The hind feet have three well-developed digits with a reduced hallux and pollux. The claws are thick and blunt (Ellerman, 1940).

The sexes of *A. paca* are difficult to distinguish externally. Based on qualitative observations, some authors have suggested that the adult male has a wider head and is slightly larger than the adult female (Matamoros, 1981; Mondolfi, 1972; Ramdial, 1972), however, Nelson and Shump (1978) found no significant differences between the sexes in 17 skull measurements. The range of external measurements (in mm) of adults are: length of head and body, 600–800; length of tail, 15–35; length of hind foot, 113–130; length of ear, 35–43 (Husson, 1978; Lander, 1974; Mondolfi, 1972). Mean cranial measurements of adult pacas are: greatest length of skull, 154.7; postnasal length, 104.7; width of braincase, 46.5; zygomatic width, 162.9; length of zygomatic plate, 69.8; maxillary width, 95.9; height of jugal, 52.7 (Nelson and Shump, 1978). The body mass ranges from 6 to 12 kg (Mondolfi, 1972).

**DISTRIBUTION.** Originally a South American species, *Agouti paca* is presently distributed from southern Mexico to northern Argentina. This distribution includes Central America, the Lesser Antilles, Cuba (Varona, 1974), Colombia, Venezuela, Guianas, Ecuador, Peru, Bolivia, Paraguay and Argentina (Fig. 2). Altitudinally, its range extends from sea level to about 1,600 m (Mondolfi, 1972). *A. paca* has been identified only from late Pleistocene cave deposits in Minas Gerais, Brasil (Winge, 1888).

**FORM AND FUNCTION.** The skin of the young is covered with horny scales of varying polygonal shapes and sizes that average about 2 mm in diameter. Each scale is surrounded by a depression in which the cuticle is thinner and pliable. On the anterior border, the scale is perforated by a group of three bristly hairs. Skin of adult pacas shows little evidence of these horny scales (Allen, 1940).

The skulls of adult pacas have a zygomatic region exceptionally modified by outgrowths from the maxillary and jugal to form large bony cheekplates (Fig. 3). These plates, about two-thirds as long as the palate, extend downward and conceal a large part of the mandible. Anteriorly, these plates enclose a deep and large cavity in front of the toothrows. This zygomatic development is known only in one other rodent, the African maned rat (*Lophiomys*; Ramdial, 1972). The zygomatic region quickly changes from the slender and smooth condition of young pacas to the elaborate structure of adults (Nelson and Shump, 1978).

The infraorbital foramen is reduced to form a narrow canal almost entirely enclosed by bone. The nasals are broad and short, while the paroccipital processes are thick (Ellerman, 1940). The hind limbs are about 50% longer than the forelimbs (324 mm and 219 mm, respectively). The tibia (106 mm in length) is almost the same size as the femur (109 mm in length) and provides a huge lever which allows the animal to make big jumps when is disturbed (Quesada and Hanan, 1988).

The dental formula, as in other caviomorphs, is  $i \ 1/1, c \ 0/0, p \ 1/1, m \ 3/3$ , total 20. The incisors are relatively thin and compressed. The cheekteeth are composed of four to five reentrant enamel folds in a crown pattern that varies as a result of wear (Friant, 1968). The fully-occluded M3 or the presence of a permanent P4 indicates that a paca is about 1 year of age (Collett, 1981).

The paca has a pair of external and a pair of internal cheek pouches. The external pouches are rather small and formed by the downward growth of the zygomatic arches, with no apparent primary use. The internal pouches extend over the medial-concave surface of the maxillary root of the zygomatic arch (Howell, 1940). Hershkovitz (1955) and Howell (1940) suggested that the function of the internal pouches is to amplify and reverberate sounds.

The transverse dimension of the brain is greater than the anteroposterior dimension and has prominent occipital lobes. The neocortex is slightly convoluted (Kraus et al., 1970). Fixed in formalin, the mass of the brain is 20.4–26 g. The ratio of brain mass to total mass varies from 1:78 to 1:157 (Pilleri, 1959). The olfactory and tactile senses are well developed, while the optical sense is poorly developed (Kraus et al., 1970).

The basal metabolic rate has been calculated at  $0.30 \text{ ml O}_2 \text{ g}^{-1} \text{ h}^{-1}$  and represents 86% of the value expected from Kleiber's allometric equation for body mass. Minimal thermal conductance is  $0.028 \text{ cm}^2 \text{ g}^{-1} \text{ h}^{-1} \text{ }^\circ\text{C}^{-1}$ . The ratio of percent basal metabolic rate to percent minimal conductance is 0.32, the lowest value obtained for 11 rodent species from South America. Body temperature is  $37.2^\circ\text{C}$  and the lower limit of thermoneutrality is  $26^\circ\text{C}$  (McNab, 1982).

External genitalia in both sexes are hidden in an anal sac. Adult males have two oval testes at least 38 mm in length and 15 to 25 mm in diameter (Lander, 1974). Size of testis remains constant after 1 year of age (Collett, 1981). There is no scrotum. Accessory reproductive glands of males consist of a pair of preputial glands and white and irregular vesicular glands (4.5 cm long by 1.7 cm wide). The seminiferous tubules of males contain A and B spermatogonia, young and old spermatocytes, secondary spermatocytes, spermatis, and spermatozoa (Pashov and Matamoros, 1984; Ureña and Bolaños, 1988).

The penis (50–70 mm in length) has a protactile glans profusely armored with small spines and two horny spicules 12–13 mm in length on the tips. The dorsal surface has short and proximally directed spicules, whereas the ventral face is smooth with the baculum relief visible medially. Cornified plates of 15–17 mm with serrate

borders occupy the sides of the penis (Matamoras, 1981; Mondolfi, 1972). Mondolfi (1972) suggested that this complex structure stimulates ovulation in the female, but Matamoras and Pashov (1984) found that the paca is a spontaneous ovulator.

Female reproductive organs consist of paired ovaries (8 by 5 mm), oviducts (50 mm in length), bicornuate uterus formed by a pair of horns (each 120 mm in length), and a vagina (140 mm in length). The ovaries of pregnant females show a large corpus luteum and numerous small accessory corpora lutea. In early pregnancy, the corpus luteum is composed entirely of large glandular cells whereas in lactating parous females it is irregular and degenerating with a loss of the thecal layers (Collett, 1981). Matamoras and Pashov (1984) found five types of oestral cycles, the most common lasting 14.3 days.

The tongue of *A. paca* (88 mm in length) is fleshy and rounded at the tip (Martin, 1838). The stomach, 152 mm in length, is separated from the duodenum by a well-defined sphincter (Matamoras and Pashov, 1982). The small intestine is large and measures 6.6 m in length. The caecum, with a basal circumference about 178 mm and 711 mm in length, is irregularly sacculated (Martin, 1838). *A. paca* has paired eversible anal glands that open into the anus. These glands are formed by sebaceous cells and measure 25–30 by 17–20 mm (Mondolfi, 1972).

During the wet season, with more abundant food available, pacas accumulate fat in the inguinal and retroperitoneal regions; this energy reserve is quickly consumed in the dry season. Bourliere (1973) called attention to evolutive convergence between paca and chevrotain (*Hyemoschus*), an ungulate that inhabits the African rain forest. Both species have similar size, body form, color pattern, diet and habitat.

**ONTOGENY AND REPRODUCTION.** *Agouti paca* breed all year. Based on cytological examination of vaginal epithelium, Matamoras and Pashov (1984) concluded that females are receptive throughout the year and that adult males produce spermatozoa throughout the year. There is no indication of seasonal clustering of births or significant age-specific variation in fecundity (Collett, 1981). Females become reproductively active at approximately 9 months of age, while males reach sexual maturity at 1 year (Collett, 1981; Matamoras, 1981).

Typically, *A. paca* bears one young once or twice annually (Mondolfi, 1972). In captivity, 38.5% of females reproduce once, 38.5% twice, and 23.1% three times/year; only one of 31 births bore two young (Matamoras, 1981).

In captivity, the gestation period was from 114 (Matamoras and Pashov, 1984) to 119 days (Lander, 1974). The average interval between births was 191 days for wild females (Collett, 1981). In captive pacas, estrus occurs shortly after birth and again toward the end of lactation (Matamoras, 1981). Collett (1981) found 12 wild females parous and pregnant, simultaneously.

Newborn are precocial, with adult appearance, open eyes, well-developed pelage, erupted incisors, and cheekteeth appearing through the gums. They are active and able to walk well. Neonates born in captivity measure 240–300 mm in total length and mass is 550–800 g (Lander, 1974; Mondolfi, 1972).

Captive young are weaned when about 12 weeks old, but take solid food after 3 weeks of age (Matamoras, 1981). For wild animals, Collett (1981) suggested that the suckling period does not exceed 6 weeks.

**ECOLOGY.** Pacas primarily inhabit tropical rain forest, although they occur in a wide variety of forest habitats, including mangrove swamps, deciduous and semi-deciduous forest, narrow riparian growth, and dense upland scrub. They prefer areas near water (Collett, 1981; Pérez, 1983).

*Agouti paca* is an opportunistic feeder. Mainly frugivorous, the diet of this species changes throughout its range and shows seasonal variation according to the availability of fruits (Collett, 1981; Gallina, 1981; Mondolfi, 1972). *A. paca* is unable to open some hard-shelled fruits, but eats the softer pericarps when the fruit has been opened by other animals; occasionally it feeds on leaves, buds, and flowers. Collett (1981) examined 116 stomachs and found that 112 contained exclusively fruit parts and four showed leaf or flower parts. Analysis of five *Agouti* feces by Gallina (1981) revealed only fruit fragments. In captivity, it consumes a great variety of food items, including cultivated fruits and vegetables, raw meat, lizards, and insects (Lander, 1974; Pérez, 1983). Coprophagy is rare (Matamoras, 1981; Mondolfi, 1972).

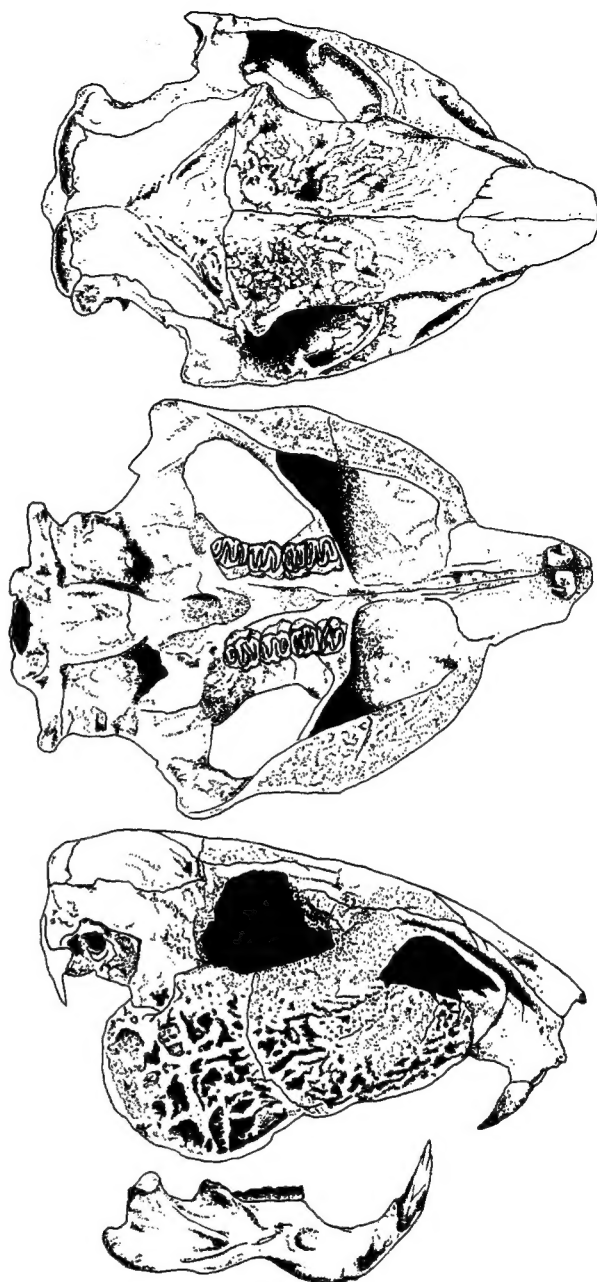


FIG. 3. Dorsal, ventral, and lateral views of cranium, and lateral view of mandible of an adult male *Agouti paca* from San José de Guaribe, Venezuela (Museum of Tropical Zoology Institute, Venezuela, I-03146). Greatest length of skull is 188 mm.

Population density of *A. paca* has been estimated in three localities. Using track frequency, Eisenberg et al. (1979) reported 25 pacas/km<sup>2</sup> for Fundo Agropecuario Masaguaral in the llanos of Venezuela. On the basis of 7 years of live-trapping data, Smythe et al. (1983) estimated the density of adult pacas on Barro Colorado Island, Panama, at 70 adults/km<sup>2</sup>. Also on Barro Colorado Island, Glanz (1983) conducted a census transect and found 40 pacas/km<sup>2</sup>. Collett (1981) reported densities of 38, 56, and 51 adult pacas/km<sup>2</sup> for three intensively hunted sites in the llanos of Colombia and suggested that 40–70 adult pacas/km<sup>2</sup> of suitable forest habitat is a reasonable estimate for the abundance of pacas in the llanos. At Parque Nacional Guatopo, Venezuela, Eisenberg et al. (1979) found that pacas represented 16% of the biomass of the 35 species of nonvolant mammals comprising the community. Similar representation has been demonstrated for this species in Panama (Eisenberg and Thorington, 1973).

Based on numbers of cementum layers in the first molar of 205 pacas from the llanos of Colombia, Collett (1981) reported the

following age structure: <1 year, 87; 1–2 years, 25; 2–3 years, 17; 3–4 years, 16; 4–5 years, 12; 5–6 years, 11; 6–7 years, 11; 7–8 years, 9; 8–9 years, 7; 9–10 years, 5; and >10 years, 5. The age of the oldest individual was 12–13 years. The sex ratio was nearly 1:1.

*Agouti paca* has low fecundity and high survivorship of adults. Annual survivorship was estimated to be 0.8 for adult females, 0.87 for adult males, and 0.35 for young (Collett, 1981). Smythe et al. (1983) suggested that high disappearance rate of young pacas live-trapped on Barro Colorado Island, Panama, indicated that the population was regulated by the availability of suitable territories.

Glanz (1983) and Smythe (1986) indicated varying levels of diet and habitat overlap of *A. paca* with *Dasyprocta*, *Proechimys*, *Sciurus*, *Tayassu*, *Mazama*, *Eira*, *Nasua*, *Potos*, *Coendou*, *Cebus*, *Caluromys*, *Metachirus*, *Ateles*, and *Alouatta*. Smythe (1986) supposed that interspecific competition for food during the dry season is the main factor of population regulation.

Guerrero (1985) summarized the known occurrence of parasites in *A. paca*: Acarina, *Amblyomma naponense*, *A. pacae*, *Androlaelaps fahrenheitsi*, *Eutrombicula alfreddugesi*, *E. goeldii*, *E. pacae*, *Ixodes lasallei*, *Ornithodoros turtilei*, *Ornithonyssus*; Siphonaptera, *Ctenocephalides felis*, *Polygenis klagesi*, *Rhopalosyllus australis*, *R. lugubris*; Nematoda, *Paraspidodera uncinata*, *Phylasoptera torresi*, *Tejeraia mediospirallis*, *Trichuris gracilis*; Cestoda, *Echinococcus cruzi*, *Raillietina demariensis*; and Protozoa, *Trypanosoma cruzi*. Other parasites reported are *Echinococcus vogeli* (Gardner et al., 1988), *Salmonella typhimurium* (Gonzalez and Espino, 1974), and *Histoplasma capsulatum* (Naiff et al., 1985).

The primary predators of *A. paca* are: *Felis onca*, *F. pardalis*, *F. concolor*, *F. wiedii*, *F. tigrina*, *F. yagouaroundi*, and *Canis latrans*. Other predators are *Crocodilus*, *Boa constrictor*, and *Speothos venaticus* (Deutsch, 1983; Lander, 1974; Mondolfi, 1972; Ramdial, 1972).

Pacas are rarely caught in live-traps, however, the use of trained dogs is an effective capture method. The procedure involves one or more men walking in the forest in the morning with at least one dog for tracking scent of pacas until an occupied burrow is located. At night, pacas are hunted near a fruitfall by shining a carbide light into their eyes. This temporarily blinds and confuses them, allowing them to be shot by the hunter (Pérez, 1983).

*Agouti paca* is hunted extensively for sport and food. Pacas are occasionally pests of agricultural crops. The meat, delicious and tender, is highly appreciated throughout the range of the species and is prized by the peoples of eastern Peru (Pierret and Dourojeanni, 1966, 1967). In Manaus, Brazil, the meat of the paca is the most popular wild-mammal dish on local restaurant menus and ranks behind only that of tapir (*Tapirus terrestris*) and peccaries (*Tayassu pecari* and *T. tajacu*) in total amount consumed. Paca constitutes 2–8% of the wild meat consumed by indigenous people of Amazonia (Ojasti, 1983).

Pacas are successfully kept in captivity. Because of their economic potential for meat production, intensive management has been proposed. Several studies provide information on the requirements to maintain this species in captivity, including characteristics of fences and burrows, enclosure size and amount of animals by enclosure (Aguirre and Fey, 1981; Matamoros, 1981; Pérez, 1983; Smythe, 1987).

**BEHAVIOR.** *Agouti paca* is nocturnal, although sometimes it is active in the early morning and late afternoon (Smythe, 1970). The paca walks along fixed trails, but if any of these trails is altered, the animal immediately rejects it and uses another path. It restricts its activity during bright moonlight. *A. paca* is a good swimmer and, when pursued, tries to reach a river or pond where it may remain submerged for a long period (Alho, 1982).

During the day, the paca remains in burrows. Pacas may live in hollow trees or among rocks (Contreras and Zetina, 1979; Walker, 1974). Burrows have two or more entrances concealed with wads of leaf litter and an average diameter of 0.2 m. Burrows may descend to depths of 0.3–0.8 m and can extend for 2.8–9 m. It is commonly believed that pacas adapt and modify the diggings of armadillos (*Dasyus novemcinctus* and *D. kappleri*) rather than excavating entire burrows by themselves (Lander, 1974).

*Agouti paca* is a solitary mammal. Of 108 encounters recorded by Collett (1981), 86 involved pacas that were alone, 21 involved two pacas (usually an adult and a young), and only once were three pacas seen together. In captivity, adults moderately tolerate the

presence of conspecifics, but frequently attack recently introduced animals; they may kill newborn (Lander, 1974; Matamoros, 1981).

Frequently, *A. paca* emits a low growl of audible frequencies >1 kHz that lasts 393–2,056 ms. This sound is repeated four times at intervals of 385–771 ms (Eisenberg, 1974). When threatened, it exhibits pilo-erection and tooth-chattering with grinding; if provoked, it will growl loudly. Females call their young with a low grunt (Eisenberg, 1974).

*Agouti paca* exhibits the frisky-hop syndrome, common in other hystricomorphs (Kleiman, 1974). The syndrome, apparently induced by olfactory stimulation, involves rapid locomotor and rotational body movement, approaches, and withdrawals, but little physical contact between conspecifics. It primarily occurs in males during courtship, although it is common in females that have been sprayed with urine during an encounter. It has not been reported in juveniles (Smythe, 1970).

When courtship begins, the female avoids the approaching male and occasionally attacks him. The male approaches her, at an angle, and then turns and attempts to urinate on her. Usually, the female reacts trying to avoid the spray. The male keeps repeating this behavior until he finally sprays her. After a number of sprayings, the female may crouch down at the approach of the male and make a low, muttering squeak. The copulation then takes place and is short in duration (Freiheit, 1966).

After parturition, the male rears up and urinates extensively over the female. It also may urinate over the young if the infant attempts to nuzzle him in the perineal region. During nursing, the female adopts a lying position while the infant rests between her feet (Smythe, 1979). In captivity, *A. paca* generally urinates and defecates in the periphery of their enclosures as a way of scent-marking (Kraus et al., 1970).

**GENETICS.** *Agouti paca* has a diploid number of 74 chromosomes and a fundamental number (FN) of 56. The karyotype consists of 12 pairs of metacentric, 2 pairs of submetacentric, 58 pairs of acrocentric, and 2 pairs of subacrocentric chromosomes (Fredga, 1966).

*Agouti taczanowskii*, the only other species in the genus, has a different karyotype with a diploid number of 42 and FN of 80. Most of the chromosomes of *A. taczanowskii* are larger in size than those of *A. paca* (Gardner, 1971).

**REMARKS.** *Cuniculus* Brisson, 1762, the oldest denomination generic name is rejected by many authorities. Despite Tate's (1935, 1939) interpretation that Opinion 90 (ICZN, 1925) validated the name *Cuniculus* Brisson, 1762, *Cuniculus* is unavailable from Brisson (1762) because that work is a reprint of Brisson (1756—pre-Linnaean) and his names are not consistently binomial (Hopwood, 1947). Tate (1935) believed, however, that because Brisson's generic bird names were accepted for nomenclatural purposes (ICZN, 1911), his generic names for mammals also should be accepted. On the contrary, Brisson's generic names for mammals are not to be accepted for nomenclatural purposes, except when validated under the plenary powers of the International Commission on Zoological Nomenclature (e.g., *Odobenus* Brisson, 1762, see Hemming, 1957).

In 1924, Thomas and other European authorities proposed to the International Commission on Zoological Nomenclature that priority rules be suspended to keep *Coelogenys* as the generic name of this species. The International Commission in Opinion 90 rejected this suspension (Tate, 1935).

There is no general agreement concerning the familial status of this taxon. Some authors place this genus in the family Dasyproctidae (Anderson and Jones, 1967; Corbet and Hill, 1980); however, chromosomal and serological evidence support a separate family (George and Weir, 1974; Woods, 1982).

Other vernacular names for the species are conejo pintado (Panama), tepezcuintle (Costa Rica), guardatinajas (Mexico), hee (Suriname), and lapa (Venezuela). Paca is the common name in Brazil and Argentina.

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#### LITERATURE CITED

AGUIRRE, G. L., AND E. FEY. 1981. Estudio preliminar del tepezcuintle (*Agouti paca nelsoni* Goldman) en la selva Lacan-



- dona, Chiapas. Publicacion del Instituto de Ecologia de Mexico, 6:45-54.
- ALHO, C. J. R. 1982. Brazilian rodents: their habitats and habits. Pp. 143-166, in *Mammalian biology in South America* (M. A. Mares and H. H. Genoways, eds.). Special Publication Series, Pymatuning Laboratory of Ecology, University of Pittsburgh, 6:1-539.
- ALLEN, G. 1940. Hair and scales of the paca. *Journal of Mammalogy*, 21:438-441.
- ANDERSON, S., AND J. K. JONES, JR. 1967. Recent mammals of the world: a synopsis of families. Ronald Press Co., New York, 453 pp.
- BANGS, O. 1902. Chiriqui Mammalia. *Bulletin of the Museum of Comparative Zoology, Harvard University*, 34:17-51.
- BOURLIERE, F. 1973. The comparative ecology of rain forest mammals in Africa and tropical America: some introductory remarks. Pp. 279-292, in *Tropical forest ecosystems in Africa and South America: comparative review* (B. J. Meggers, E. S. Ayensu, and W. D. Duckworth, eds.). Smithsonian Institution Press, Washington, D.C., 350 pp.
- BRISSON, M. J. 1762. *Regnum animale in classes IX distributum sive synopsis methodica sistens generalem animalium distributionem in classes IX, & duarum primarum classium, Quadrupedum scilicet & Cetaceorum, particularem divisionem in ordines, sectiones, genera & species. Cum brevi cutusque speciei descriptione, citationibus auctorum de iis tractantium, nominibus eis ab ipsis & nationibus impositis, nominibusque vulgaribus*. Theodorum Haak, Leiden, 296 pp.
- BUFFON, G. L. L. 1763. *Histoire naturelle, générale et particulière, avec la description du cabinet du Roi*. L'Imprimerie Royale, Paris, 10:1-368.
- CABRERA, A. 1961. Catálogo de los mamíferos de America del Sur. II. Revista del Museo Argentino de Ciencias Naturales "Bernardino Rivadavia" e Instituto de Ciencias Naturales, 4: 309-732.
- COLLETT, S. 1981. Population characteristics of *Agouti paca* (Rodentia) in Colombia. Publication of the Museum, Michigan State University, Biological Series, 5:485-602.
- CONTRERAS, H., AND F. ZETINA. 1979. Comportamiento reproductivo y datos de la alimentación de *Agouti paca nelsoni* Goldman. *Acta Zoologica Lilloana*, 35:283-285.
- CORBET, G. B., AND J. E. HILL. 1980. A world list of mammalian species. British Museum of Natural History, London, 226 pp.
- CUVIER, G. F. 1807. *Annales du Musée d'histoire Naturelle*, X, pp. 201-209 (not seen, cited in Tate, 1935).
- DEUTSCH, L. A. 1983. An encounter between bush dog (*Speothos venaticus*) and paca (*Agouti paca*). *Journal of Mammalogy*, 64:532-533.
- EISENBERG, J. F. 1974. The function and motivational basis of hystricomorph vocalizations. Symposium of Zoological Society of London, 34:211-247.
- EISENBERG, J. F., M. A. O'CONNELL, AND P. V. AUGUST. 1979. Density, productivity and distribution of mammals in two Venezuelan habitats. Pp. 187-207, in *Vertebrate ecology in the northern Neotropics* (J. F. Eisenberg, ed.). Smithsonian Institution Press, Washington, D.C., 271 pp.
- EISENBERG, J. F., AND R. W. THORINGTON, JR. 1973. A preliminary analysis of a Neotropical mammal fauna. *Biotropica*, 5:150-161.
- ELLERMAN, J. R. 1940. The families and genera of living rodents. I. British Museum of Natural History, London, 689 pp.
- ERXLEBEN, I. C. P. 1777. *Systema regni animalis per classes, ordines, genera, species, varietates cum synonymia et historia animalium*. Classis I, Mammalia. Weygandianis, Lipsiae, 636 pp.
- FISHER, G. 1814. *Zoognosia tabulis synopticis illustrata. Volumen tertium. Quadrupedum reliquorum, cetorum et montrymatum descriptionem continens*. Nicolai Sergeidis Vsevolozsky, Mosquae, 732 pp.
- FREDGA, G. 1966. Chromosome studies in five species of South American rodents (suborder Hystricomorpha). *Mammalian Chromosome Newsletter*, 20:45-46.
- FREIHEIT, C. 1966. Courtship activity of the paca. *Journal of Mammalogy*, 46:707.
- FRIANT, M. 1968. La morphologie des dents jugales du paca. *Annales de la Société Royale Zoologique de Belgique*, 98:139-146.
- GALLINA, S. 1981. Contribución al conocimiento de los hábitos alimenticios del tepezcuinte (*Agouti paca* Lin.) en Lancajá-Chansayab, Chiapas. Publicacion del Instituto de Ecologia de Mexico, 6:55-67.
- GARDNER, A. L. 1971. Karyotypes of two rodents from Peru, with a description of the highest diploid number recorded for a mammal. *Experientia*, 26:1088.
- GARDNER, S. L., R. L. RAUSCH, AND O. C. J. CAMACHO. 1988. *Echinococcus vogeli* Rausch and Bernstein, 1972, from the paca, *Cuniculus paca* L. (Rodentia: Dasyproctidae), in the Departamento de Santa Cruz, Bolivia. *The Journal of Parasitology*, 74:399-402.
- GEOFFROY ST.-HILAIRE, E. 1803. *Catalogue des mammifères. Musée National d'Histoire Naturelle, Paris*, 272 pp.
- GEORGE, W., AND B. J. WEIR. 1974. Hystricomorph chromosomes. Symposium of Zoological Society of London, 34:105-108.
- GERVAIS, P. 1854. *Histoire naturelle de mammifères avec l'indication de leurs mœurs, et de leurs rapports avec les arts, le commerce et l'agriculture*. Primates, cheiroptères, insectivores et rongeurs. L. Curmer, Paris, 418 pp.
- GLANZ, W. 1983. The terrestrial mammal fauna of Barro Colorado Island: censuses and long-term changes. Pp. 455-468, in *The ecology of a tropical forest: seasonal rhythms and long-term changes* (E. Leigh, Jr., A. Rand, and D. Windsor, eds.). Smithsonian Institution Press, Washington, D.C., 468 pp.
- GOLDMAN, E. A. 1913. Descriptions of new mammals from Panama and Mexico. *Smithsonian Miscellaneous Collection*, 60: 1-20.
- GONZALEZ, A., AND M. ESPINO. 1974. Un caso de salmonellosis en majaz (*Cuniculus paca*). *Revista de Investigaciones Pecuarias*, 3:93.
- GUERRERO, R. 1985. Parasitología. Pp. 35-92, in *El estudio de los mamíferos en Venezuela: evaluación y perspectiva* (M. Aguilera, ed.). Fondo Editorial del Acta Científica Venezolana, Venezuela, 256 pp.
- HAGMANN, H. G. 1908. Die landsäugetiere der insel Mexiana. Als beispiel der einwirkung der isolation auf die umbildung der arten. *Archiv für Rasse Gessellschaft Biologisch*, Munich, 5: 1-35.
- HALL, E. R. 1981. *The mammals of North America*. Second ed. John Wiley and Sons, New York, 2:601-1181 + 90.
- HARLAN, R. 1825. *Fauna Americana: being a description of the mammiferous animals inhabiting North America*. Anthony Finley, Philadelphia, 318 pp.
- HEMMING, F. (ED.). 1957. Opinion 467. Validation under the plenary powers of the generic name "Odobenus" Brisson, 1762, as the generic name for the walrus (class Mammalia). *Opinions and Declarations Rendered by the International Commission on Zoological Nomenclature*, 16:73-78.
- HERSHKOVITZ, P. 1955. On the cheek pouches of the tropical American paca *Agouti paca* (Linnaeus, 1766). *Saugetierkundliche Mitteilungen*, 3:67-70.
- HOLLISTER, N. 1913. The type species of *Cuniculus* Brisson. *Proceedings of the Biological Society of Washington*, 26:79.
- HOPWOOD, A. T. 1947. The generic names of the mandrill and baboons, with notes on some of the genera of Brisson, 1762. *Proceedings of the Zoological Society of London*, 117:533-536.
- HOWELL, A. B. 1940. Cheek pouches of the paca. *Journal of Mammalogy*, 21:361.
- HUSSON, A. M. 1978. The mammals of Suriname. *Zoologische Monographien, Rijksmuseum van Natuurlijke Historie*, 2:1-569.
- ILLIGER, C. 1811. *Prodromus systematis mammalium et avium additis terminis zoographicis utriusque classis, eorumque versione germanica*. C. Salfied, Berlin, 302 pp.
- INTERNATIONAL COMMISSION ON ZOOLOGICAL NOMENCLATURE. 1911. Opinion 37. Shall the genera of Brisson's "Ornithologia," 1760, be accepted. Pp. 87-88, in *Opinions rendered by the International Commission on Zoological Nomenclature*. *Opinions 30 to 37*. Publication of the Smithsonian Institution, 2013:69-88.
- . 1925. Opinion 90. Report on sixteen generic names of mammals for which suspension of rules was requested. Pp. 34-39, in *Opinions rendered by the International Commission*

- on Zoological Nomenclature. Opinions 82 to 90. Smithsonian Miscellaneous Collections, 73:1-39.
- KERR, R. 1792. The animal kingdom or zoological system, of the celebrated Sir Charles Linnaeus. Class I. Mammalia: containing a complete systematic description, arrangement, and nomenclature, of all the known species and varieties of the Mammalia, or animals which give suck to their young; being a translation of that part of the *Systema Naturae*, as lately published, with great improvements, by Professor Gmelin of Goettingen. Together with numerous additions from more recent zoological writers, and illustrated with copperplates. A. Strahan, T. Cadell, and W. Creech, Edinburgh, 400 pp.
- KLEIMAN, D. G. 1974. The patterns of behaviour in hystricomorph rodents. Symposium of the Zoological Society of London, 34: 171-209.
- KRAUS, C., M. GIHR, AND G. PILLERI. 1970. Das Verhalten von *Cuniculus paca* (Rodentia, Dasyproctidae), in Gefangenschaft. *Revue Suisse de Zoologie*, 77:353-388.
- KRUMBIEGEL, I. 1940. Die säugetiere der Sudamerika-Expeditionen Prof. Dr. Kriegs. 7. Pakas. *Zoologischer Anzeiger*, 132: 223-238.
- LACÉPÈDE, B. G. E. DE. 1799. *Tableau des divisions, sousdivisions, ordres et genres des mammifères*. Plassan, Paris, 18 pp.
- LANDER, A. 1974. Observaciones preliminares sobre lapas *Agouti paca* (Linn. 1766) (Rodentia, Agoutidae) en Venezuela. Trabajo de Ascenso, Universidad Central de Venezuela, Venezuela, 104 pp.
- LESSON, R. P. 1842. *Nouveau tableau du règne animal*. Mammifères. Arthus-Bertrand, Paris, 204 pp.
- LIAIS, E. 1872. *Climat géologie, faune et géographie botanique du Brésil*. Garnier Frères, Paris, 640 pp.
- LINNAEUS, C. 1766. *Systema naturae, per regna tria naturae secundum classes, ordines, genera, species cum characteribus, differentiis, synonymis, locis*. Twelfth ed. L. Salvii, Holmiae, 1(part 1):1-533.
- LÖNNBERG, E. 1921. A second contribution to the mammalogy of Ecuador with some remarks on Caenolestes. *Arkiv för Zoologi*, 14:1-104.
- MARES, M. A., AND R. A. OJEDA. 1982. Patterns of diversity and adaptation in South American hystricognath rodents. Pp. 393-432, in *Mammalian biology in South America* (M. A. Mares and H. H. Genoways, eds.). Special Publication Series, Pymatuning Laboratory of Ecology, University of Pittsburgh, 6: 1-539.
- MARTIN, W. 1838. On the visceral anatomy of the spotted cavy (*Coelogenys subniger* Cuv.). *Proceedings of the Zoological Society of London*, 6:52-55.
- MATAMOROS, Y. 1981. Anatomía e histología del sistema reproductor del tepezcuintle (*Cuniculus paca*). *Revista de Biología Tropical*, 29:155-164.
- MATAMOROS, Y., AND B. PASHOV. 1982. El estómago del tepezcuintle (*Cuniculus paca*) su estructura histológica y algunas reacciones histoquímicas. *Ciencias Veterinarias*, 4:15-20.
- . 1984. Ciclo estral del tepezcuintle (*Cuniculus paca*, Brisson) en cautiverio. *Brenesia*, 22:249-260.
- MENAB, B. K. 1982. The physiological ecology of South American mammals. Pp. 187-207, in *Mammalian biology in South America* (M. A. Mares and H. H. Genoways, eds.). Special Publication Series, Pymatuning Laboratory of Ecology, University of Pittsburgh, 6:1-539.
- MONDOLFI, E. 1972. La lapa o paca. *Defensa de la Naturaleza*, 2:4-16.
- NAIFF, R. D., W. Y. MOK, AND M. F. NAIFF. 1985. Distribution of *Histoplasma capsulatum* in Amazonian wildlife. *Micopathologia*, 89:165-168.
- NELSON, T. W., AND K. SHUMP, JR. 1978. Cranial variation and size allometry in *Agouti paca* from Ecuador. *Journal of Mammalogy*, 59:387-394.
- OJASTI, J. 1983. Consumo de fauna por una comunidad indígena en el Estado Bolívar, Venezuela. *Symposio Conservación y Manejo de Fauna Silvestre Neotropical*, 9:45-50.
- PALLAS, P. S. 1766. *Miscellanea zoologica quibus novae imprimis atque obscurae animalium species describuntur et observationibus iconibusque illustrantur*. P. Van Cleef, Hague, 224 pp.
- PASHOV, B., AND Y. MATAMOROS. 1984. Descripción histológica del epidídimo seminífero del testículo del tepezcuintle (*Cuniculus paca*, Brisson 1762) e identificación de sus diferentes etapas. *Ciencias Veterinarias*, 6:9-12.
- PÉREZ, E. M. 1983. La lapa: recurso natural aprovechable. Trabajo de Ascenso, Universidad Simón Rodríguez, Venezuela, 64 pp.
- PIERRET, P., AND M. DOUROJEANNI. 1966. La caza y la alimentación humana en las riberas del río Pachitea, Perú. *Turrialba*, 16:271-277.
- . 1967. Importancia de la caza para la alimentación humana en el curso inferior del río Ucayali, Perú. *Revista Forestal de Perú*, 1:10-21.
- PILLERI, G. 1959. Beiträge zur vergleichenden morphologie des nagetiergehirnes. *Acta Anatomica*, 39:1-124.
- QUESADA, R., AND G. HANAN. 1988. Osteología del tepezcuintle (*Cuniculus paca*), cinturas y miembros. *Anatomía, Histología y Embriología*, 17:60-71.
- RAMDIAL, B. 1972. The natural history and ecology of the paca (*Cuniculus paca*). Lands and Survey Department. Mapping and Control Section, Trinidad, 11 pp.
- RENGGER, J. R. 1830. *Naturgeschichte der säugetiere von Paraguay*. Schweghauserschen, Basel, 394 pp.
- SMYTHE, N. 1970. Ecology and behavior of the agouti (*Dasyprocta punctata*) and related species on Barro Colorado Island, Panama. Ph.D. dissert., University of Maryland, College Park, 217 pp.
- . 1986. Competition and resource partitioning in the guild of Neotropical terrestrial frugivorous mammals. *Annual Review of Ecology and Systematics*, 17:169-188.
- . 1987. The paca (*Cuniculus paca*) as a domestic source of protein for the Neotropical, humid lowlands. *Applied Animal Behavioral Science*, 17:155-170.
- SMYTHE, N., W. GLANZ, AND E. LEIGH, JR. 1983. Ecology and population regulation in pacas and agoutis. Pp. 227-238, in *Seasonal rhythms and long-term changes in tropical forest* (E. Leigh, Jr., ed.). Smithsonian Institution Press, Washington, D.C., 468 pp.
- STOLZMANN, J. 1885. Description d'un nouveau rongeur du genre *Coelogenys*. *Proceedings of the Zoological Society of London*, 11:161-167.
- TATE, G. H. H. 1935. The taxonomy of the genera of Neotropical hystricoid rodents. *Bulletin of the American Museum of Natural History*, 68:295-447.
- . 1939. The mammals of the Guiana region. *Bulletin of the American Museum of Natural History*, 76:151-229.
- THOMAS, O. 1924. Some notes on pacas. *Annals and Magazine of Natural History*, 13:237-239.
- UREÑA, F., AND R. BOLAÑOS. 1988. Tipo de espermatozonios en "tepezcuintle" (*Cuniculus paca*). Estudio ultraestructural. *Revista de Biología Tropical*, 36:325-328.
- VARONA, L. S. 1974. *Catálogo de los mamíferos vivos y extinguidos de las Antillas*. Academia de Ciencias de Cuba, 139 pp.
- VON OLFERS, I. F. 1818. Bemerkungen zu Illiger's Ueberblick der saugthiere nach ihrer vertheilung über die welttheile, rucksichtlich Sudamericanischen Arten. *Journal von Brasilien*, 2: 192-237.
- WAGLER, J. A. 1830. *Natürliches system der Amphibien, mit vorangehender classification der säugthiere und vögel*. J. G. Cotta'schen Buchhandlung, München, Stuttgart und Tübingen, 354 pp.
- WALKER, E. P. 1974. *Mammals of the world*. Johns Hopkins University Press, Baltimore, 2:647-1500.
- WIED-NEUWIED, M. P. 1821. Reise nach Brasilien in den Jahren; 1815 bis 1817. H. L. Bronner, Frankfurt, 112 pp.
- . 1826. Beiträge zur Naturgeschichte von Brasilien. Verzeichniss der Amphibien, Säugthiere, und Vogel, welche auf einer Reise Zwischen dem 13ten und dem 23sten Grade südlicher Breite im östlichen Brasilien beobachtet wurden. II. Abtheilung. Mammalia. Säugthiere. Landes-Industrie-Comptoirs, Weimar, 622 pp.
- WINGE, H. 1888. Jordfundne og nuvelende gnave (Rodentia) fra Lagoa Santa, Minas Geraes, Brasilien. E Museo Lundii, Copenhagen, 1-200.
- WOODS, C. A. 1982. The history and classification of South American hystricognath rodents: reflections on the far away and long ago. Pp. 377-392, in *Mammalian biology in South*

America (M. A. Mares and H. H. Genoways, eds.). Special Publication Series, Pymatuning Laboratory of Ecology, University of Pittsburgh, 6:1-539.

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